

# NORTH WEST DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT. FARMER SUPPORT SERVICES.

Procedure for calculating plant population and estimating grain yield

Presented by: NA Nesengani  
[nndanganeni@nwpg.gov.za](mailto:nndanganeni@nwpg.gov.za)

Date: 25 February 2021  
Venue: Mogwase LAO

RSS  
Arable Farming - Potchefstroom

Contact : (018) 299 6529



# Outline

Introduction

Plant population

Estimating grain yield

Sampling

Estimating process (maize as an example)

Conclusion



# 1. INTRODUCTION

- Hactare (Ha)
- **1 hactare (1ha) represents approximately an area like two contiguous soccer fields (100m x 100m)**
- **100 m x 100 m is equal to 10 000 m<sup>2</sup>.**



# Plant population

- To calculate plant population per hectare is easy if you know the row and inter-row spacing of the planted crop in a field.
- Let assume that the maize field belonging to Moruleng farmers has spacing of 1 m (row spacing) and 50 cm (intra-row spacing).
- First you need to calculate the number of rows per hectare
  - 100 divided by 1 which is equal to 100 rows (total number of rows per hectare).
- Secondly you need to determine the number of plants per row:
  - Take a note that spacing between plants in a row is given in centimeters (50 cm) and that must be converted into m as follows:
    - 50 divided by 100 is equal to 0.5 m (spacing between plants in a row).
    - 100 m row divided by 0,5 is equal to 200 plant (total number of plants within a row).
- Total number of rows in a hectare multiplied by total number of plants per row gives 20 000 plants per hectare .



# Estimating grain yield

- Done prior to harvest to find out how much of yield will be harvested.
- Grain yield estimations are based on a process of sampling. Samples are then converted to a yield per area (tones or Kg per hectare).
- Always use a tape measure to measure distances not walk spaces or guess work. Use calculator to perform calculations and cross check to avoid mistakes.
- In the case of small field (less than 2ha) take at least three to five samples.



# Sampling

- A tape measure is used to accurately determine a specific row length or area.
- The number of plants or cobs within this row length or area are counted.
- A representative sample is taken, including from the best to the worse plants or cobs. Then the number of kernels are counted and the average number of kernels per plant or cob is obtained.
- The average kernel mass of each crop's kernels is then multiplied by the average number of kernels per cob.
- The average kernel mass per plant is then multiplied by the number of plants or cobs per measured row length or area.
- The mass per sampling locality is then converted to tons per hectare.



# Maize: grain yield estimation process

- Average kernel (grain) mass of maize at 12.5% moisture content = 0.28 grams.
- sample few representative places in the field (10 m row length) and determine the average number of kernels per cob as follows: .
- Take a cob and count the number of kernels per row and the number of rows, multiply the two with each other to get the average number of kernels per cob.
- Count at each of the 10 m row length the number of cobs, to determine the number of cobs per 10m row. Multiply the average number of kernels per cob with 0,28g to get the average mass in grams per cob.



# Process cont.

- Multiply the average mass (g) per cob with the average number of cobs per 10 m row = A gr per 10m.
- Determine the average row spacing with a tape measure.
- The number of rows per 100 x 100 row length = 1ha = B
  - **The calculation is as follows:**
    - $\frac{B \times A}{10} = \text{gr per ha}$

**NB: Converting grams to kilograms, you divide the figure by 1000.  
Converting kilograms to tones, you divide the figure by 1000.**







# THE END



**Agriculture &  
Rural Development**  
Department:  
Agriculture and Rural Development  
North West Provincial Government  
REPUBLIC OF SOUTH AFRICA

